

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1-39 are pending in the application, with claims 1, 11, 22, 33, and 37 being the independent claims. No new claims are sought to be added. No claims are sought to be amended. No claims are sought to be cancelled. No new matter is introduced.

Based on the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding rejections and that they be withdrawn.

Response to Amendment

The Examiner requests that the Applicants clarify the electrical echo formed by the hybrid at the same end as the acoustic echo, as given in Applicants FIG. 7, labeled 'Hybrid H'. The 'Hybrid H' block represents the residual electrical 2 wire-4 wire hybrid reflection from the far end that rings through the system electrically and acoustically, adding to the acoustic feedback from voice. Near end transmission reflected by the 2 wire-4 wire hybrid connection at the far end is cancelled by adaptive filter W, as given in Applicants FIG. 7, element [200]. Residual 2 wire-4 wire hybrid reflection feeds into the receive line, represented by the 'Hybrid H' block.

Rejections under 35 U.S.C. § 103(a)

Claims 1-3, 6, 8-12, 14, 15, 17-20, 22, 23, 25, 27-31, 33, 36, and 37 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over W.E. Eppler, Jr. et al., "Conference Telephone Using Dynamic Modeled Line Hybrid", U.S. Patent No.

5,600,714, February 4, 1997 ("Eppler"), in view of B.M. Finn, "Acoustic Echo Cancellation in an Integrated Audio and Telecommunication System", U.S. Patent No. 5,706,344, January 6, 1998 ("Finn"). Applicants respectfully traverse and request reconsideration.

With respect to independent claim 1, the Examiner contends in point 2 of the Examiner's Office Action Summary for Application No. 09/703,264, August 21, 2006, that Eppler discloses "...an echo canceller..." in FIG. 1, comprising an "...adaptive filter..." , represented by element [24] in FIG. 1, with "...coefficients...adapted to cancel...an...echo..." in the near end. In the same point, the Examiner contends that Eppler does not disclose cancellation of "...a secondary audio signal...", but that Finn does disclose cancellation of a near end secondary audio signal, and a means to combine secondary audio with far end telephony reflections, and that these elements are disclosed by Finn in column 1, lines 23-44.

The Applicants respectfully disagree with the Examiners' contention that either Eppler or Finn disclose an "...adaptive filter having filter coefficients adapted to cancel a combination of an electrical and an acoustical echo in a near end signal...", as recited in claim 1. To the contrary, Eppler uses a filter that is adaptive when initially trained with white noise, but is fixed following training, and does not adapt to far end echo. An explicit description of the adaptive filter and training procedure is given by Eppler in column 8, lines 23-32 and lines 52-57.

Similarly, Finn trains an LMS filter continuously on low-level white noise for echo cancellation. The LMS filter is described by Finn in column 3, lines 52-59; the white noise driven echo cancellation is described by Finn in column 4, lines 36-49.

By contrast, the Applicants adaptive filter is updated by signal echo, requiring a more sophisticated filter, as characterized in claim 1, than that of Eppler or Finn, both of whom update filter coefficients by simply injecting white noise into the near end receive channel. For at least these reasons, independent claim 1 is patentable over the cited references. Reconsideration and allowance of independent claim 1 is respectfully requested.

The Examiner has rejected independent claims 11, 22, 33, and 37 using the identical arguments used in rejecting independent claim 1. Arguments made by the Applicant for claim 1 apply equally to independent claims 11, 22, 33, and 37. For at least these reasons, independent claims 11, 22, 33, and 37 are also patentable over the cited references. Reconsideration and allowance of independent claims 11, 22, 33, and 37 is respectfully requested.

Claims 2-3, 6, and 8-10 are dependent on independent claim 1. Claims 12, 14, 15, and 17-20 are dependent on independent claim 11. Claims 23, 25, and 27-31 are dependent on independent claim 22. Claim 36 is dependent on independent claim 33. Arguments for these independent claims have been made in the preceding paragraphs. For at least these reasons, dependent claims 2-3, 6, 8-10, 12, 14, 15, 17-20, 23, 25, 27-31, and 36 are also patentable over the cited references. Reconsideration and allowance of these dependent claims is respectfully requested.

Further, dependent claims 13 and 24 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Eppler in view of Finn. Claims 13 and 24 are dependent on independent claims 11 and 22, respectively. Arguments for independent claims 11 and 22 have been made in the preceding paragraphs. For at

least these reasons, dependent claims 13 and 24 are also patentable over the cited references. Reconsideration and allowance of claims 13 and 24 is respectfully requested.

Claims 4, 21, 32, 35, and 39 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Eppler in view of Finn, and further in view of G.C. Sih, "Double-Talk Detection by Means of Spectral Content", U.S. Patent No. 5,732,134, March 24, 1998 ("Shi"). Applicants respectfully traverse and request reconsideration.

With respect to dependent claim 4, the Examiner contends in point 2 of the Examiner's Office Action Summary that Eppler and Finn disclose an echo cancellation system for primary reflection and secondary audio signals. The Examiner contends in point 4 of the Examiner's Office Action Summary that Eppler and Finn fail to disclose double talk logic, but that Sih *does* disclose "...double talk logic to detect speech in the near end signal...", described in Sih, column 1, lines 52-67. The double talk logic disclosed by Sih is spectral based. *Id.* at FIG. 2, *see*, elements [40], [42], and [44].

As argued for claim 1, combining Eppler and Finn does not disclose an adaptive echo cancellation system for telephony as given by the Applicants, where as stated in claim 1, the adaptive filter is adapted for "...electrical and an acoustical echo in a near end signal...", and not adapted to white noise injected into the near end audio signal, as is done in both Eppler and Finn. For at least these reasons, dependent claim 4 is patentable over the cited references. Reconsideration and allowance of claim 4 is respectfully requested.

The Examiner has rejected dependent claims 21, 32, 35, and 39 using the identical arguments used in rejecting dependent claim 4. Arguments made by the Applicant for claim 4 apply equally to dependent claims 21, 32, 35, and 39. For at least these reasons, dependent claims 21, 32, 35, and 39 are also patentable over the cited references. Reconsideration and allowance of claims 21, 32, 35, and 39 is respectfully requested.

Claim 5 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Eppler in view of Finn, and further in view of E.H.M. Sellenslagh et al., "Telephone Pulse Metering System", U.S. Patent No. 3,433,898, March 18, 1969 ("Sellenslagh"). Applicants respectfully traverse and request reconsideration.

With respect to dependent claim 5, the Examiner contends in point 2 of the Examiner's Office Action Summary that Eppler and Finn disclose an echo cancellation system for primary reflection and secondary audio signals. The Examiner contends in point 5 of the Examiner's Office Action Summary that Eppler and Finn fail to disclose cancellation of a secondary audio signal, where the "...secondary audio signal comprises a pulse metering tone." The Examiner contends in point 5 that Sellenslagh *does* disclose pulse metering tone cancellation.

Applicants respectfully disagree. Sellenslagh is concerned with the specification of a pulse metering system for telephone systems, but nowhere in the Sellenslagh patent application text nor in the Sellenslagh patent application FIGs. 1-15 does Sellenslagh teach or suggest echo cancellation of any kind. For at least these

reasons and those given above for claim 1, dependent claim 5 is patentable over the cited references. Reconsideration and allowance of claim 5 is respectfully requested.

Claims 7, 16, 26, 34, and 38 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Eppler in view of Finn, and further in view of A. Hasegawa, "Echo Cancellor for a Packet Signal", U.S. Patent No. 5,905,717, May 18, 1999 ("Hasegawa"). Applicants respectfully traverse and request reconsideration.

With respect to dependent claims 7, 16, 26, 34, and 38, the Examiner contends in point 2 of the Examiner's Office Action Summary that Eppler and Finn disclose an echo cancellation system for primary reflection and secondary audio signals. The Examiner contends in point 6 of the Examiner's Office Action Summary that Eppler and Finn fail to disclose "...a decimator that downsamples the secondary audio signal to match a sample rate of the primary telephony signal." The Examiner contends in point 6 of the Examiner's Office Action Summary that Hasegawa *does* disclose decimation of the audio signal in column 1, lines 15-27.

Applicants respectfully disagree. Hasegawa decimation (resampling) requires buffering and reclocking high-rate packet data signals, reducing the data rate to the point where an adaptive FIR filter can function. Hasegawa decimation is described explicitly in column 1, lines 15-27. In FIG. 1, element [1], Hasegawa buffers and decimates, or unpacks, the packet data prior to adaptive filtering, element [3]. In FIG. 1, element [5], Hasegawa buffers and interpolates, or repacks, the packet data prior to transmission. Signal models for unpacking (decimation) and repacking (interpolation) are given by Hasegawa in FIGs. 5A,B and 7A,B, respectively.

Hasegawa resampling is different than that of the Applicants. In claim 7, the Applicants echo cancellation "...downsamples the secondary audio signal to match a sample rate of the primary telephony signal...", or voice signal, the secondary audio signal comprising near end audio and pulse metering tones, as given in Applicants FIG. 7, elements [304] and [340]. Buffering data is not necessary in claim 7; voice data, unlike packet data, is not transmitted and received in high-rate data bursts. For at least these reasons and those given above for claim 1, dependent claims 7, 16, 26, 34, and 38 are patentable over the cited references. Reconsideration and allowance of claims 7, 16, 26, 34, and 38 is respectfully requested.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read 'Michael D. Specht', written in a cursive style.

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